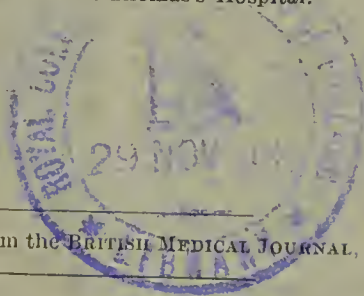


with the author's kind regards.

THE SURGERY  
OF THE  
SUBPERITONEAL TISSUE.

READ IN THE  
SECTION OF SURGERY,  
*At the Annual Meeting of the British Medical Association in  
Carlisle, July, 1896.*

BY  
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Reprinted for the Author from the *BRITISH MEDICAL JOURNAL*, October 17th, 1896.

LONDON:  
PRINTED AT THE OFFICE OF THE BRITISH MEDICAL ASSOCIATION,  
429, STRAND, W.C.

1896.





## THE SURGERY OF THE SUBPERITONEAL TISSUE.

In the beginning of the present century the peritoneum, now endowed with a voluminous literature of its own, was scarcely recognised as a structure having a special interest for the surgeon, and even fifty years ago our best textbooks contained nothing but casual references to peritonitis.<sup>1</sup> The subperitoneal tissue is in worse case, for although of an import little inferior to that of the peritoneum, it is ignored in the indices to the latest anatomical and surgical manuals, its diseases remain unclassified, and only one endeavour has been made to consider it as a whole and with its many connections and extensions from the anatomical standpoint.<sup>2</sup> There is, however, a large amount of information with reference to its diseases scattered under various headings through recent monographs and periodical literature, and one section has been adopted and carefully tended by gynaecologists. I trust that the collection and completion of this material will lend us a broader grasp of a series of important lesions linked closely together by their anatomical relationship.

Our comprehension of the origin and tendencies of these various diseases is so essentially dependent upon a knowledge of the anatomy of the structures they involve that I venture to offer a brief summary of the conclusions arrived at in the paper to which I have referred.

The subperitoneal tissue is the lower or subphrenic portion of a vast and complicated distribution of mesoblastic elements primarily developed around the great vessels in front of the spine, and in the early evolution of the embryo spreading with the laminae viscerales around the trunk wall, and running with the vascular subdivisions to the viscera, the budding limbs, and in fact to all parts of the body.

*Structurally* the subperitoneal planes consist of highly elastic areolar tissue containing fat, and traversed by bands of unstripped muscular fibre. In an average subject the areolar tissue varies in amount from a thick accumulation loaded with fat, as at the starting point in front of the spine, to a gauzy film that may easily be mistaken for the peritoneum in surgical operations. It is sometimes capable of division into laminae, and its interstices as well as the spaces that separate it from the vessels and other structures it ensheaths are of the nature of lymph spaces. The *cavum Retzii* in the

<sup>1</sup> See South's *Chelius*, 1847. Reference to the diseases of the peritoneum is also omitted in Cooper's *Surgical Dictionary*, published in 1825 (5th edition).

<sup>2</sup> Anderson and Makins. The Planes of Subperitoneal and Subpleural Connective Tissue, with their Extensions. *Journ. Anat. and Phys.*, vol. xxv, 1890.

prevesical region, once the battleground of a fierce anatomical conflict, is a dependency of the tissue, partially isolated from the rest by a thin fibrous expansion derived from the fasciæ transversalis.

The amount of adipose tissue supported by the meshwork varies greatly in different individuals and in different periods in the life of the same person. It is usually most developed in front of the spine and around the kidneys, but it may accumulate extensively between the layers of the mesentery, in the great omentum and in other situations, and may then bulk largely in the total weight of the body and add seriously to the girth of the waist. The unstriped muscular fibre is seen in the form of bands extending from the fasciæ lining the abdomen to the viscera. Its most familiar example is the fibro-muscular band of Treitz which supports the termination of the duodenum, but it is also found in the mesentery, the mesocolon, and the broad ligaments, and in all cases appears to be sustentacular in function.

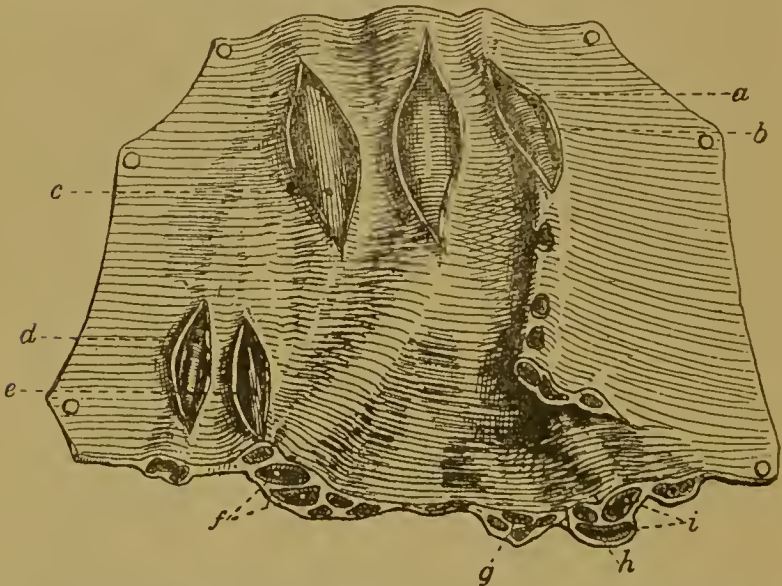


Fig. 1.—Subperitoneal tissue dissected from posterior abdominal wall, with contained vessels, etc. *a.* Aorta; *b.* inferior mesenteric artery; *c.* vena cava; *d.* spermatic vessels; *e.* ureter; *f.* external iliac vessels; *g.* ureter; *h.* lymphatic gland; *i.* external iliac artery and vein.

The *contents* of the tissue besides some foetal relics in the broad ligaments and behind the rectum are essentially the great vessels in front of the spine, around which it is primarily developed, the receptaculum chyli with its tributaries and their glands, the great sympathetic plexuses, and the lumbar and the sacral nerves. Investing these it sends with all their subdivisions sheath-like prolongations which penetrate almost to the periphery.

*Relations.*—It is intimately related to the parietes, the peritoneum, and the viscera. In its parietal relation it forms a continuous ~~sheath~~ *sheet* around the inner surface of the abdomino-pelvic wall, in contact with the diaphragmatic, transversalis, iliac, and pelvic fasciæ. In its peritoneal relation it is loosely



adherent to the parietal layer of the serous membrane, permitting the ready detachment of this in such operations as the extraperitoneal ligature of the iliac vessels; and passing inwards between the meso-colic, mesenteric, parametric and other folds it reaches the viscera, disappearing as a demonstrable membrane where the visceral peritoneum tightly adheres to the organ with which it is connected. In its visceral relations its behaviour is variable. In the case of the kidney (Fig. 2), having run outwards along the renal vessels it invests the entire organ and its duct loosely with a capsule containing usually a considerable quantity of fat; it also covers in the suprarenal body, as Glisson's capsule it is prolonged over and into the liver, and it forms more or less complete sheaths for the other organs which are partly or wholly retroperitoneal, such as the pancreas, the third portion of the duodenum, and the presacral portion of the rectum. In the case of the "mesenteric" intestine (Fig. 3), it is demonstrable only over about a fourth of the circumference where the layers of the mesentery separate to enclose the gut, but on the "non-mesenteric" portions of the canal, such as the ascending and descending colon, it is more widely related. In the pelvis, it completely invests the greater portion of the mesial rectum and surrounds the capsule of the prostate in the male; it is in contact with a portion of the bladder in both sexes, and in the female it runs between the layers of the broad ligament to reach the hilum of the ovary (Fig. 4), the interserous portion of the Fallopian tube, the sides and part of the front of the uterus, and the greater portion of the vagina. The levatores ani and coccygei with their fasciæ (Fig. 5) separate it from the perineal, ischio-rectal and anal regions.

The extra-abdominal prolongations are of great importance. The tissue, ensheathing as it does the great retroperitoneal vessels and nerves and all their subdivisions, runs with them in the form of vaginal processes in all directions—outwards through the abdominal wall to the surface, backwards into the spinal canal, downwards beneath Poupart's ligament into Scarpa's triangle, where it forms the femoral sheath and canal, through the inguinal canal into the labium or scrotum, through the obturator and sciatic foramina into the deep thigh, the perineal ischio-rectal, and gluteal regions and down the back of the lower limb; finally in an upward direction it passes through the various openings in the diaphragm to become continuous with the subpleural tissue and mediastina.

If we analyse one of these subperitoneal sheaths inside or outside the abdomen, for example, the iliac or femoral sheath, it is invariably found to consist of three compartments, containing respectively an artery, a vein, and a bundle of lymphatic cords, with occasionally a gland (as in the crural canal), and to these is usually added a fourth compartment for a nerve. The portal canal, one of the extensions of the tissue, contains also a duct. Such a sheath may derive some fibres from deep fasciæ in its neighbourhood (as in the case of the femoral sheath), but these do not form an essential part of it. Dissepimented sheaths of this kind may be traced almost all over the body.

To summarise:—The subperitoneal tissue ensheaths the retroperitoneal structures, it separates the parietal peritoneum from the abdominal wall, it is interposed between the laminae of all the visceral peritoneal folds, it comes into more or less

extensive contact with all the organs in the abdominal and pelvic cavities, and it accompanies as a sheath-like investment every vessel and nerve that escapes from the abdomen.

A consideration of the structure of the tissue and of its relations and extensions will enable us to forecast the surgical conditions in which it may become involved.

(a) Through its structural elements it becomes subject to



Fig. 2.—Semidiagrammatic view of relations of subperitoneal tissue to vessels and viscera. Section opposite upper border of second lumbar vertebra. *a*. Ascending layer of trans. meso-colon; *b*. duodenum (third portion) receiving attachment of band of Treitz; *c*. portion of head of pancreas; *d*. superior mesenteric vein (artery to left); *e*. vena cava (aorta to left); *f*. duodenum, second portion; *g*. lymphatic; gland; *h*. right kidney; *i*. second lumbar vertebra, upper surface *j*. transverse colon; *k*. descending colon; *l*. peritoneum; *m*. anterior portion of fatty capsule; *n*. left kidney; *o*. peritoneal cavity; *p*. parietal layer of subperitoneal fascia; *q*. fatty capsule; *r*. ureter; *s*. Renal vessels embedded.

(1) neoplasms, fatty, fibrous, myomatous, sarcomatous, and cystic; (2) primary inflammatory processes of surgical or accidental origin; (3) atrophic and degenerative changes which favour certain visceral displacements—as movable kidney and hernia.

(β) Through its parietal, peritoneal, and visceral relations it is liable to implication in all inflammatory and malignant af-

fections of the abdomino-pelvic walls, of the peritoneum, and of the viscera; and to infiltration with secretions and excretions from the latter.

(γ) Through its vascular, glandular, and foetal contents it is subject to hæmorrhages, dropsical and lymphatic extravasations, to certain cystic tumours, and to secondary malignant disease.

(δ) Through its perivascular extensions it may become involved in processes arising in the thorax, perineal and ischio-rectal regions, external genitals, lower extremities, and elsewhere; or its own diseases may spread in any of the directions named, as when a perinephric or subphrenic abscess opens into the mediastina, pleura, lung, or pericardium; or when a subperitoneal fatty growth runs through the inguinal canal or any other weak point in the abdominal wall.

Amongst these manifold sources of affection it may be very difficult for the surgeon to distinguish the starting-point of any given subperitoneal manifestation, since the structure and connections of the tissue favour the most remarkably wide and rapid extension of morbid processes in various directions. A study of the diseases of the subperitoneal tissue as a whole is necessary for the diagnosis of a considerable proportion of the cases that may come under our notice, and for the prognosis of the eventualities of their cause.

The subjoined classification of subperitoneal diseases as a whole may help to guide discussion:

#### *Inflammations.*

Classified according to etiology	Classified according to locality
1. Idiopathic.	1. Retroperitoneal (including mesocolic-mesenteric, etc.)
2. Tuberculous.	2. Subphrenic.
3. Syphilitic.	3. Perinephric.
4. Metastatic.	4. Iliac.
5. Traumatic.	5. Pelvic (including parametric).
6. Consecutive, of parietal, peritoneal, visceral, lymphatic, or remote origin.	6. Prevesical.

#### *Neoplasms.*

*Primary:* 1. Lipoma, and fibrolipoma: (α) Retroperitoneal (may become mesenteric, mesocolic, omental, or parametric). (β) Hernial, through inguinal, femoral or obturator openings, through the linea alba, and in other situations. (c) Intraperitoneal, after the manner of appendices epiploicæ.

2. Fibroma.

3. Myoma and fibromyoma.

4. Sarcoma.

5. Cysts, simple, hydatid, dermoid, etc.

*Secondary:* Carcinoma or sarcoma conveyed by lymphatics or blood vessels.

#### *Hæmorrhages.*

From rupture of healthy or diseased vessels.

#### *Lymph Exudations.*

From injury or disease of the receptaculum chyli, or its tributaries.

#### *Extravasation of Secretions or Excretions.*

Bile, fæces, etc.



*Gaseous Infiltrations.*

Air from communication with lung. Intestinal gases from perforation of gut. Gases of decomposition.

*Atrophy.*

Leading to displacement of organs—as in movable kidney, hernia, etc.

## SUBPERITONEAL CELLULITIS.

The subject of inflammation of the subperitoneal tissue is a very wide one. The condition meets the surgeon at every step in his practice. It may arise independently without any apparent cause; it dogs his abdominal sections and certain operations in the neighbourhood of the

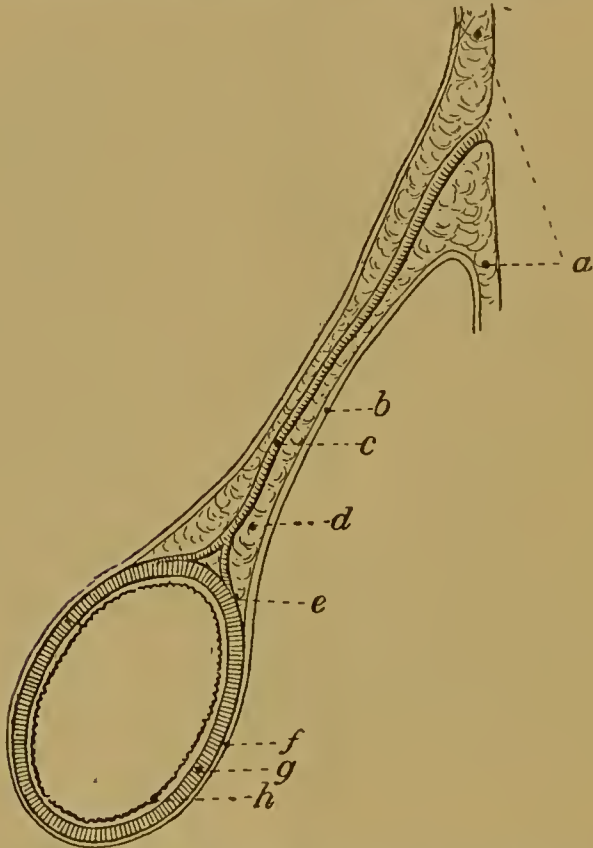


Fig. 3. Diagram of mesentery and intestine. *a.* Retroperitoneal tissue; *b.* peritoneum; *c.* intestinal artery; *d.* mesenteric extension of subperitoneal tissue; *e.* portion of intestinal wall uncovered with peritoneum and in contact with subperitoneal tissue; *f.* serous coat of intestine; *g.* muscularis; *h.* mucosa.

abdomen; it may follow nearly all the diseases and injuries of the abdominal and pelvic parietes and viscera, and even thoracic and still more remote affections; and its products tend to travel in directions that may lead the observer wide of the starting-point. Its literature has always been dispersed under various regional headings, such as retroperitoneal, subphrenic, perinephric, iliac, or pelvic cellulitis, and we may even find an elaborately subdivided section devoted to the



inflammation of the cavum Retzii; but if we compare the accounts of the origin of these various manifestations—those of subphrenic abscess by Maydl,<sup>3</sup> of perinephric abscess by Halle<sup>4</sup> or Péan,<sup>5</sup> or of cellulitis of the cavum Retzii by Englisch,<sup>6</sup> we shall see that the lists of causes overlap each other so completely that nearly all real etiological distinction between them is lost. The fact is that the lymphatic interspaces in the subperitoneal planes, while circumscribing inflammatory or other exudations in some cases, allow the widest possible extension in others, and it is almost always difficult to assign with certainty its true point of origin to any given abscess recognised as subperitoneal, or to predict its course. For example, an accumulation of pus in the

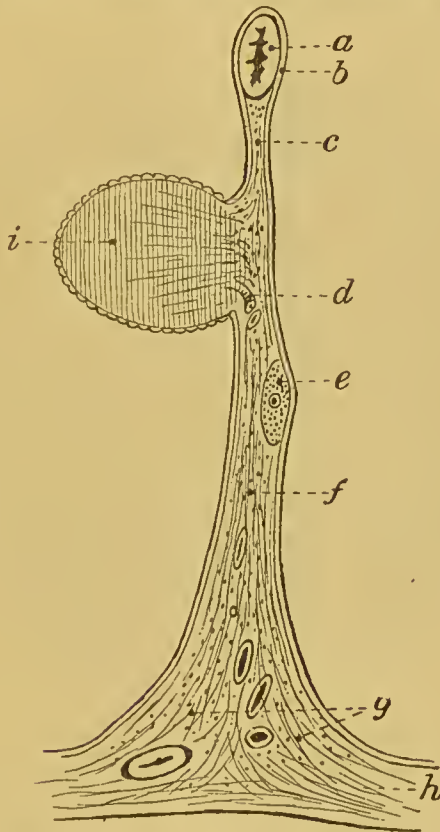


Fig. 4. Diagrammatic Section of the Broad Ligament. *a.* Fallopian tube; *b.* peritoneum; *c.* subtubal portion of broad ligament containing tubal vessels, parovarium, etc., with subperitoneal tissue; *d.* ovarian vessels; *e.* round ligament; *f.* subperitoneal tissue with muscular fibre and vessels; *g.* base of broad ligament, with uterine vessels and ureter; *h.* pelvic subperitoneal tissue; *i.* ovary.

neighbourhood of the right kidney, beneath the diaphragm, or in the cavum Retzii, would be called perinephric, subphrenic, or prevesical, but it might have arisen in almost any part of the abdominal or pelvic walls, or in connection

<sup>3</sup> *Ueber subphrenische Abseesse*, Wien, 1894.

<sup>4</sup> *Les phlegmons perinephretiques*, Thèse de Paris, 1869.

<sup>5</sup> *Tumeurs de l'abdomen et du bassin*.

<sup>6</sup> *Wiener med. Woch*, 1891, Nos. 42 to 46.

with any of the viscera. On the other hand, a subperitoneal abscess secondary to an appendicitis may become iliac, perinephric, subphrenic, retroperitoneal, pelvic, or pre-vesical, or all of these, and our diagnosis must often be based upon a process of exclusion which obviously necessitates a mental revision of every possible source of infection. The localisation of the palpable sign, say abscess, of course helps us in some degree, but it is easy to let it lead us seriously astray both in our diagnosis and prognosis. The complexity of the questions involved in these cases increases yearly as new material accumulates. It is but a few years since that at least one of the viscera, the pancreas, was held free of blame in subperitoneal cellulitis, but the researches of Balzer and others have shown that a pancreatitis may be the determining cause of a subphrenic abscess. Körte, in the Berlin Surgical Congress of 1894, described a "fatty necrosis"

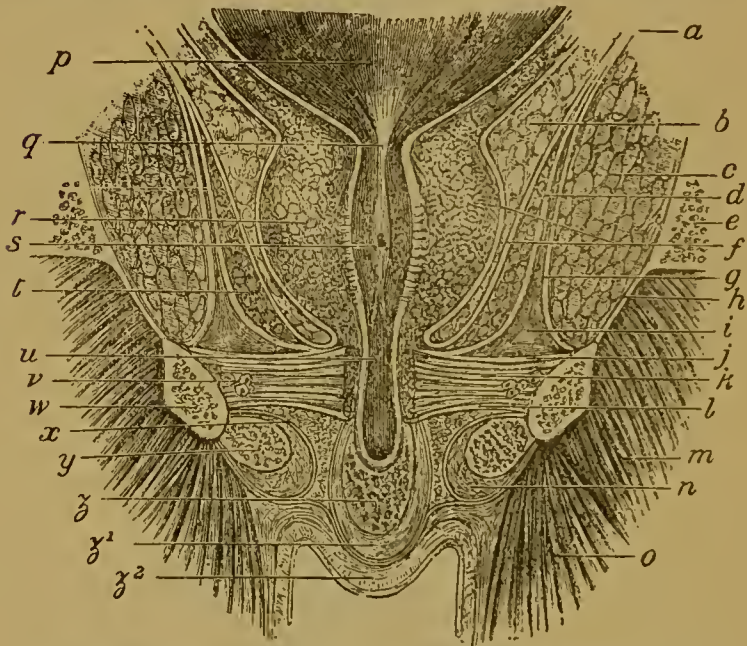


Fig. 5.—Vertical frontal section of the pelvis, showing fasciæ (modified from Braune). *a*. white line; *b*. subperitoneal fat; *c*. obturator internus; *d*. ischio-rectal fascia; *e*. os innominatum; *f*. recto-vesical fascia, parietal and visceral layers; *g*. obturator fascia; *h*. obturator membrance; *i*. ischio-rectal fossa, ant. extension; *j*. deep triangular lig.; *k*. deep transversus perineæ; *l*. superficial triangular ligament; *m*. muscles of thigh; *n*. ischio-cavernosus; *o*. muscles of thigh; *p*. bladder; *q*. uvula vesicæ; *r*. prostate; *s*. veru moutanum; *t*. levator ani; *u*. membranous urethra; *v*. pudic vessels; *w*. pubic arch; *x*. fascia of ischio-cavernosus; *y*. crus penis; *z*. bulb; *z*<sup>1</sup>. bulbo-cavernosus with its fascia; *z*<sup>2</sup>. integument of perineum.

of the pancreas (probably secondary to inflammation), with an abscess that perforated the diaphragm and opened into the left pleural cavity, and within the present month Dr. Cayley has published an interesting case in point.<sup>7</sup> In other forms, too, our knowledge is increasing rapidly, and it will be noted that nearly the whole of the references bearing upon the question of subperitoneal inflammation are of very recent date.

<sup>7</sup> BRITISH MEDICAL JOURNAL, July 4th, 1896

The cases of subperitoneal cellulitis may be conveniently grouped under the headings named in the table of classification. The idiopathic forms, found chiefly in subjects with a tuberculous history, may be passed over briefly. They resemble the "cold abscesses" of an older pathology and may disappear spontaneously or be quickly and permanently relieved by the surgeon. It is probable that many of the so-called idiopathic cases are due to slight and forgotten injuries. A sickly child aged 2 years and 3 months was admitted into St. Thomas's Hospital in May last with a reniform tumour on the left side of the abdomen. It was apparently extraperitoneal, but was so deeply placed that it was difficult to be certain on this point. On incision it was found to be a circumscribed abscess of the subperitoneal tissue without any evidence of connection with the intra-abdominal structures. The cavity was emptied and scraped and the wound was closed. Healing followed by first intention and the child was discharged at the end of three weeks. The only cause that could be traced was a slight contusion.

The tuberculous, syphilitic, and metastatic forms, too, need not delay us, as the subperitoneal tissue merely shares the danger with other connective tissue planes in the body; but the traumatic form is far more frequent and important. Setting aside the cases in which a simple contusion is the only apparent cause—and according to Halle a contusion of the lumbar region is a frequent cause of perinephric abscess—the condition of particular interest to us is that which occurs after operations involving division of the structures of the abdominal wall, as well as certain others, such as herniotomy, castration, or ligature of a varicocele, which do not come under the heading of abdominal or lumbar section. In any of these procedures an accidental infection may lead to widespread implication of the subperitoneal planes. In preantiseptic days the contingency was, doubtless, of far greater frequency in proportion to the number of operations than now, but an attempt was seldom made to define the structure involved by the abscess. Chopart, however, describes a perinephric abscess which followed a castration, and other references of a like kind may be gathered by a study of the detailed reports of the older operations. Even at the present time it is not rare. Occasionally it may be traced to an accidentally infected ligature or some other preventable cause, but its advent often appears to be determined less by any want of precaution on the part of the surgeon than by a diminished resistance of the patient to the attack of organisms which almost necessarily gain admission to a large open wound or may already exist in the blood.

In a case of my own the removal of an ovarian tumour in a feeble girl of tuberculous antecedents (and who subsequently died of phthisis), was followed by subperitoneal suppuration, and the pus, in spite of all efforts to circumscribe its extension, travelled down through the *cavum Retzii* deeply into the pelvis. In another case which I have already recorded<sup>3</sup> the patient, a young and healthy looking man, was a barman, and although not a drunkard was in the habit of drinking freely. He was admitted with a threatening abscess in the abdominal wall, apparently subperitoneal, following a contusion. This slowly subsided without active surgical treatment, and a few weeks later the man elected to undergo an operation for

<sup>3</sup> *Lancet*, 1893, 2, p. 193.



the removal of a double inguinal lipoma simulating hernia. The wounds suppurated freely and deeply on both sides, but eventually healed. A year later, the lipomata having recurred, a second operation was undertaken, and again subperitoneal abscess followed. There was no neglect of care on either occasion, and the failure could only be attributed to lowered resistance on the part of the patient. In another case, not under my own care, I have seen extensive subperitoneal suppuration with grave septicæmia follow an operation for the radical cure of a varicocele in a weakly and intemperate subject. These peritoneal suppurations, however, are seldom dangerous or even tedious in the present day. If the usual precautions have been taken, and suppuration follow, it is nearly always of a very benign type. The patient may show no disturbance of health or temperature, and it is only perhaps at the end of a week when the dressings are removed that the abscess is found distending the line of suture. The pus when set free is usually inodorous, and the cavity closes rapidly and permanently.

The consecutive form is that which affords the largest material for consideration. It may arise from a multitude of sources—from disease in the parietes, especially the spinal and pelvic bones and joints; in the peritoneum; in any of the abdominal or pelvic viscera; in the lymph glands within the planes of the tissue itself; and in regions altogether outside the abdomen. To deal separately with all the causes named would trench upon the territories of a dozen specialties, and occupy a vast amount of time. There are, however, a few generalisations that may be safely and briefly expressed.

First: a subperitoneal cellulitis may originate in any part of the abdomen and pelvis, and from any of the structures, parietal, visceral, or other, related to the subperitoneal tissue.

Secondly: while a cellulitis of parietal origin, as from disease of the vertebræ or pelvic bones involves the subperitoneal tissue directly; an inflammation of visceral origin may reach the tissue in three ways—by direct continuity at a point where the viscus is uncovered with peritoneum (and we have seen that some portion of every viscus is in more or less direct relation to the subperitoneal tissue); by a perforation of the subperitoneal space at a point of inflammatory adhesion between the visceral and parietal peritoneum; or by a necrosis of peritoneum through long contact with pus in a localised intra-peritoneal abscess. As pointed out by Dr. Hawkins,<sup>9</sup> the transperitoneal modes of infection are the almost invariable cause of cellulitis secondary to appendicitis, and the same has been shown by Dr. Cullingworth<sup>10</sup> to be the case in ovarian and tubal inflammations.

Thirdly: whatever its origin, it may spread by continuity and invade any portion of the tissue, showing itself in the iliac, perinephric, subphrenic, or any other region, usually remaining confined to the side of the body on which it began, but sometimes appearing in the middle line, or crossing to the opposite side.

Fourthly: a subperitoneal abscess tends to find its way to the surface of the body, seldom opening into the peritoneal cavity, and very rarely into a viscus. A localised intra-

<sup>9</sup> *Diseases of the Vermiform Appendix.*

<sup>10</sup> BRITISH MEDICAL JOURNAL, 1890, II, p. 1468



peritoneal abscess, on the other hand, is prone to discharge into any visceral cavity against which it lies. This has been confirmed in pelvic suppuration by Dr. Cullingworth,<sup>10</sup> and holds good in other regions.

Fifthly : a cellulitis beginning in the subperitoneal tissue may travel away from the abdominal cavity in four chief directions—outwards to the surface of the trunk (abdomen or loins), downwards towards the pelvic outlets and lower extremities, inwards into the peritoneal cavity, and upwards into the thorax. In the trunk it most commonly shows itself in the loin, conducted by the posterior branches of the lumbar vessels, but it may appear in the hypochondrium, at the median line, in the sheath of the rectus, above the iliac crest, or elsewhere. It is possible also that pus might find its way into the spinal canal along the course of the spinal branches of the posterior divisions of the lumbar vessels.

In the downward direction it may run beneath Poupart's ligament into Scarpa's triangle, or it may reach the deeper parts of the thigh through the obturator foramen. In rare cases it may even involve the hip joint, either through the ilio-psoas sheath and bursa, or through the fat in the ligamentum teres (which communicates with the subperitoneal fat along the course of the obturator vessels). It may reach the inguinal canal, following the round ligament or spermatic cord ; or the ischio-rectal fossa along the pudic and inferior hæmorrhoidal vessels ;<sup>11</sup> or the sacral and gluteal region and the back of the thigh, after passing through the greater or lesser sacro-sciatic foramen.

In an upward direction it may pass into the thorax through any of the vascular apertures in or around the diaphragm, or probably through weak points in the central tendon, and it has been known to reach the mediastina, the pleura, the lung, and the pericardium. Perinephric abscesses are said to be more prone than others to invade the thorax. Dr. J. W. White relates two cases,<sup>12</sup> one opening into the pericardium, the other into the pleura, and mentions that in an analysis of twelve cases in Schmidt's *Jahrbucher* five out of the number opened into the pleura. Loumeau<sup>13</sup> publishes a case in which a left perinephric abscess opened into a bronchus.<sup>14</sup>

Finally, in a central direction it may break into the peritoneal cavity, or, in rare instances, into a viscus.

How widely a suppuration starting from a single point may spread has been repeatedly demonstrated, and as types of these I may offer brief notes of two out of several cases in my own experience.

CASE I.—A young man, aged 21, entered St. Thomas's Hospital in May, 1892. He was well grown and well nourished, and of good family history, but between the ages of 13 and 17 he had been subject to superficial abscesses which healed slowly after incision. A month before admission an abscess appeared in the left groin. This quickly increased in size, but

<sup>11</sup> Schlesinger has experimentally demonstrated a connection between the connective tissue interspaces of the ischio-rectal fossa and the pelvic subperitoneal tissue. A subperitoneal cellulitis, due to the extension of an ischio-rectal abscess, has been reported by Mr. Arbuthnot Lane (BRITISH MEDICAL JOURNAL, 1891, i, p. 354).

<sup>12</sup> BRITISH MEDICAL JOURNAL, 1891, i, p. 1002.

<sup>13</sup> *Journ. de Méd. de Bordeaux*, 1891, No. 41.

<sup>14</sup> Several cases of a converse nature, of empyema and other forms of intrathoracic suppuration have been published in recent years, one of these, by Krause, of an empyema pointing at Poupart's ligament ; and in another recorded by Mohr the pus found its way down to the knee (*L'Union Médicale*, vol. xxii, p. 546—876).

caused little pain or illness. Its puncture gave vent to 48 ounces of foul pus. Three weeks later an abscess appeared over the right iliac fossa, and also yielded a large quantity of foul pus, in which a few days later particles of undigested food were discovered. He slowly improved, and at the end of seven months left the hospital apparently well. In October, 1894, he was readmitted with a large ischio-rectal abscess, which was found to extend upwards into the pelvis. A month afterwards a large collection of matter appeared in the left iliac fossa. This, too, was opened, and its cavity—of enormous size—was found to reach to the kidney above and inwards beyond the middle line, isolating the iliac vessels, which could be felt lying in a bath of pus. Two months later a new formation was found in the right iliac fossa apparently communicating with that on the left side. The pus had no offensive odour, and gradually ceased to flow. The patient again left the hospital, but in June, 1894, was readmitted with a new abscess, which pointed in the left ischio-rectal fossa and by the side of the sacrum over the greater sacro-sciatic foramen. Again treatment was successful, and the patient was discharged with only a small sinus in the gluteal region. In May last he returned in good health, but the sinus, which was of little depth, still remained. This has been excised, and the patient is now apparently at the end of his long misfortunes.

There can be no doubt that the suppuration was appendicular in origin, but it is interesting that it first showed itself in the left groin and subsequently in the left ischio-rectal fossa and over the left sacro-sciatic foramen as well as in the usual situation. The isolation of the iliac vessels did not produce any effect upon the circulation, but a long-continued contact of the vein with pus is not always so harmless. In a case published by Dr. Foot,<sup>15</sup> an abscess in connection with the appendix invading the perinephric and subphrenic connective tissue dissected out the strands of the lumbar plexus, and led to plugging of the internal iliac vein as far as the inferior cava, and to death from septicæmia. In the following case a similar implication of the vein occurred, and the course of the disease was terribly malignant and pitiless.

A girl, aged 18, was admitted into St. Thomas's Hospital on January 3rd, 1895, with an inflammatory induration in the right iliac fossa. For nine months before she had suffered from frequently-recurrent attacks of pain and tenderness in the same region, associated with constipation and vomiting, but these subsided under rest and treatment, and the condition was attributed to appendicitis. After entering the hospital the local inflammation, which was accompanied by high temperature, showed no sign of advance or cure, and at length it was decided to make an exploratory incision. The knife passed deeply through hard infiltrated tissue but without reaching pus. No relief followed. A week later a little caseous pus, without any faecal odour, escaped from the wound, and continued to flow in variable quantity. There was still no improvement, but the inflammation began to spread into the pelvis, into the thigh and gluteal region, and finally into the cavum Retzii, showing itself above the symphysis. No further symptoms pointing to the appendix arose, but on opening one of the pelvic abscesses the probable cause of the inflammation was discovered in an area of superficial caries at the back of the pubic bone, and extending outwards along the ileum. The diseased bone was gouged away as far as possible, but without good result. A little later the right lower extremity began to swell, and the femoral vein was found to be thrombosed. The same condition probably existed in the iliac veins where they lay within the area of inflammation, but it was not possible to ascertain this. The patient wasted day by day, and lay in great suffering until June 14th—nearly seven months after her entry into the hospital—when she died, symptoms of œdema of the left lung showing themselves at the close. No *post-mortem* examination was allowed.

In this case, the symptoms, which were strongly suggestive of appendicitis at the beginning, were apparently due to the disease found in the os innominatum, but the condition was peculiar in its unrelenting course and in the wide diffusion of the area of infection.

#### NEW GROWTHS.

The primary subperitoneal tumours have been enumerated as lipomata, fibromata, myomata, sarcomata, and cysts. The

<sup>15</sup> BRITISH MEDICAL JOURNAL, 1881, i, p 17.

tissue may also be invaded by certain growths—fibromata, etc., originating in the parietes, and by primary or secondary neoplasms in the lymph glands.

#### LIPOMA.

The lipomata have considerable surgical interest owing to the enormous size which they may reach, and to the difficulty of diagnosing their nature before operation. They may be subdivided clinically into certain varieties. (1) those which remain confined to the subperitoneal space, such as the retroperitoneal, mesenteric, omental, and parametric growths, which nearly all originate retroperitoneally; (2) those which escape through weak points in the parietes, forming fatty hernias; and (3) those which grow into the peritoneal cavity like the normal appendices epiploicæ.

The retroperitoneal, mesenteric, omental, and parametric lipomata are amongst the most remarkable of the structurally innocent growths.<sup>16</sup> They occur in adults of both sexes, but are about twice as frequent in women as in men. They are more less encapsuled in some cases while in others they appear to consist of a diffuse hypertrophy of the subperitoneal fat. Their connective tissue element may be scanty, or in considerable proportion (fibrolipoma). They are prone to myxomatous degeneration, and in rare cases may be associated with sarcoma.<sup>17</sup> They are usually single, occasionally multiple, and may assume colossal dimensions. Pick records a case in which the growths weighed nearly 30 pounds.<sup>18</sup> Homans<sup>19</sup> removed two tumours weighing respectively  $25\frac{3}{4}$  and 24 pounds besides others of smaller size, and in Lennander's case<sup>20</sup> the weight reached 33 pounds (15 kilogrammes). Their rate of growth is very variable, sometimes extending over many years, at others extremely rapid, and in the latter case may induce the most extreme signs of perverted or rather of diverted nutrition. In Pick's case<sup>21</sup> the history extended only over six months, and as the tumour grew the patient, a man aged 36, assuming the aspect of cancerous cachexia, emaciated with extreme rapidity, and subsequently died of exhaustion. The tumours begin in most cases in the retroperitoneal tissue of the loin and iliac fossa, more commonly on the right side, and in their growth press forwards the peritoneum and insinuate themselves between the layers of the mesentery, mesocolon, omentum, or broad ligament, displacing the viscera and tending to compress the great vessels. Their diagnosis has been unsuccessful, rather because of the rarity of the condition than from any intrinsic difficulty. Only one case was recognised before operation, by Terrier, who had met with the condition once before. In the others the nature of the disease was revealed under the knife of the surgeon or in the *post-mortem* room.

The operation for their removal is necessarily dangerous when the tumours are allowed to attain a large size. Excision has nevertheless been successful in the hands of Magde-

<sup>16</sup> See monographs by Terrillon, *Arch. Gén. de Méd.*, i, 1886, p. 257, and Terrier and Guillemin, *Revue de Chirurg.*, 1892, p. 727.

<sup>17</sup> *Virchow's Archiv*, 1865, T. xxxii, p. 543

<sup>18</sup> *Trans. Path. Soc.* 1869, p. 337.

<sup>19</sup> *Lancet*, 1882, i, p. 44.

<sup>20</sup> *Centralbl. f. Chirurg.*, 1895, p. 97.

<sup>21</sup> *Loc. cit.*



lung,<sup>22</sup> Péan,<sup>23</sup> Meredith,<sup>24</sup> Lauwers,<sup>25</sup> Treves,<sup>26</sup> Brüntzel,<sup>27</sup> and Lennander,<sup>28</sup> but in Magdelung's case it was necessary to resect the colon; in Lennander's, which extended into the mesentery and lay in front of the intestine, the transverse colon became gangrenous, the patient recovering with an artificial anus; and Brüntzel's, excision of a fibrolipoma weighing  $37\frac{1}{2}$  pounds, was followed by a faecal fistula. In Treves's case, in which the tumour extended into the broad ligament, and was of relatively small size (72 ounces), the encapsulation was fairly complete and the enucleation easy, but it was necessary to cut off the ovary and Fallopian tube, which were stretched over the growth. In most of the cases, however, the lipoma has been found so intimately related to the viscera and great vessels that the operation has become one of extreme danger. In seven cases it has been fatal, mostly from shock, but in two from intractable diarrhoea, possibly set up by nutritive disturbance in the portion of the intestinal canal interfered with during the removal of the growth.

The results in the future will no doubt be less discouraging, because surgical intervention will be called for at an earlier period and because surgical antisepsis is yearly becoming more thorough. It is doubtful, however, whether in the diffuse forms the good result of excision will always be permanent.

*Hernial Lipomata.*—The most common manifestation of localised lipomatosis, if such a term may be used, is that in which the overgrowth, which is always continuous with the rest of the tissue, pierces and widens one of the weak points in the abdominal wall; by preference the inguinal or femoral ring or a defect in the linea alba (Fig. 6). The presence of fat in the inguinal, femoral, and obturator canals is in a certain sense physiological; but when the growth assumes a development out of proportion to that of the rest of the tissue it may take on the appearances of a true hernia, or it may open the way for one by drawing after it a tube of parietal peritoneum; and not only may it do this in the process of actual growth, but its atrophy from senile or other causes may lead to a precisely similar pouching of the serous membrane. It is now many years since Roser asserted that the growth of fat in the lymph passage which we call the femoral canal predisposed to femoral hernia by widening the naturally weak point in the abdominal wall, and often drawing with it a process of parietal peritoneum; and there is no doubt that most cases of spontaneous ventral hernia at the linea alba have the same origin. Sometimes, however, the hernia appears to be determined rather by the atrophy of the fat which normally fills the passage, the parietal peritoneum then pouching into the canal to fill the gap. This is certainly the case in obturator hernia, which nearly always occurs in aged and emaciated women,<sup>29</sup> and it is possible that in femoral, sciatic, and perineal hernias the way is sometimes prepared in a like manner.

<sup>22</sup> *Arch. Gén. de Méd.*, 1886, p. 257.

<sup>23</sup> *Tumeurs de l'Abdomen et du Bassin*, vol. i.

<sup>24</sup> *Trans. Clin. Society*, 1887, p.

<sup>25</sup> *An. de Méd. Belge.*, 1891, pp. 311 to 316.

<sup>26</sup> *Trans. Clin. Society*, 1893, p. 101.

<sup>27</sup> *Berl. klin. Wochenschr.*, December 4th, 1842.

<sup>28</sup> *Loc. cit.*

<sup>29</sup> See reports of two cases of obturator hernia by the author. *Lancet*, 1896, i, p. 924.



The inguinal form is the most common of the hernial lipomata. It was noted by Pelletan as early as 1780, and was discussed some years ago by Mr. Jonathan Hutchinson, jun.<sup>30</sup> The records lately collected down to date by Sarazin<sup>31</sup> show that it is somewhat more common on the left side, but not sufficiently so to warrant any speculations as to the cause of the apparent preference. In a few cases they originate in the fat lobules which, as shown by Henle, are normally a constituent of the spermatic cord and may remain confined to the scrotum, but usually they pass through the inguinal canal and are directly continuous with the subperitoneal tissue. They are separated by a kind of limiting membrane from the elements of the cord, but occasionally, as in a case published by Reclus,<sup>32</sup> are diffused amongst the spermatic vessels. They sometimes comprise a considerable proportion of fibrous tissue (fibrolipoma), and like the retroperitoneal tumours may undergo myxomatous degeneration, or may even contain sarcomatous elements.

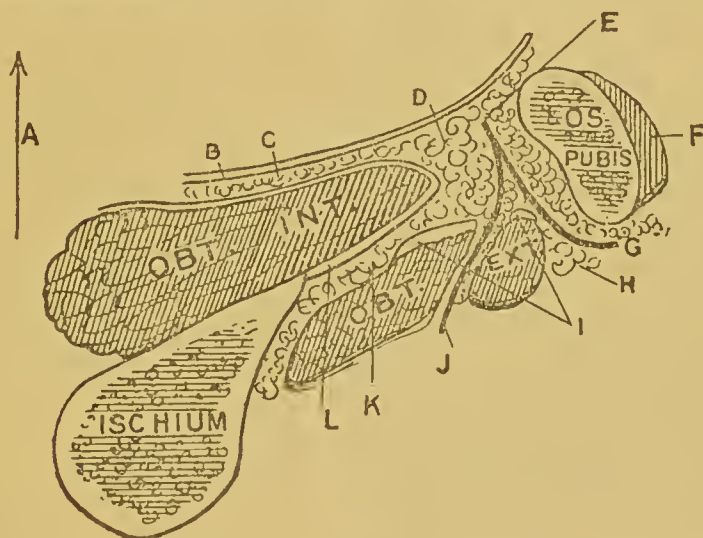


Fig. 6.—Diagram of the obturator canal. From a preparation in St. Thomas's Hospital. *a*. Longitudinal axis of body; *b*. parietal peritoneum; *c*. subperitoneal tissue; *d*. subperitoneal fat occupying obturator canal; *e*. obturator nerve; *f*. pectineus muscle; *g*. anterior division of obturator nerve emerging per (accompanied by vessels); *h*. lower opening of obturator canal; *i*. external obturator membrane of Fischer; *j*. posterior branch of canal transmitting posterior division of obturator nerve and vessels; *k*. fat containing space between the two obturator membranes (*i* and *l*); *l*. internal obturator membrane.

In some cases they are quite solid, but in others they enclose a prolongation of peritoneum in which may lie a coil of intestine, as in a case mentioned by Annandale, or which may become shut off from the general peritoneal cavity to form a serous cyst in the midst of the tumour. In rare instances, too, a peritoneal pouch may become folded over a fatty extrusion in such a way that a double layer of serous membrane is divided in exposing the tumours

<sup>30</sup> *Trans. Path. Soc.*, v. xl, p. 191.

<sup>31</sup> *Thèse de Paris*, 1895. Contribution à l'Étude des Lipomes du Cordon.

<sup>32</sup> *Bull. Soc. de Chirurg.*, 1888, p. 634.

with the knife. These tumours, whatever their origin, may attain remarkable dimensions. In a case published by Deguise,<sup>33</sup> the growth was as large as a man's head, in others under Brossard,<sup>34</sup> Koch,<sup>35</sup> Reclus,<sup>36</sup> and Hue,<sup>37</sup> the weight ranged from 3 to 11 pounds, and Wilms is said to have extirpated a monster of 19½ pounds. In Hue's case the tumour weighed 11 pounds, and the patient was obliged to carry his scrotum in a bag suspended around his neck.

The mixed tumours may reach even a greater size. Karewski<sup>38</sup> successfully excised a lipoma containing fibrous, myxomatous, and sarcomatous elements weighing nearly 20 pounds (8,950 grammes). Before the operation the patient found it necessary to rest the tumour upon the ground before taking a seat, lest the mass should make him slip from the chair. As a rule, however, the growths come under treatment while they are of small dimensions, and are often mistaken for hernias until operation is undertaken. Their diagnosis, indeed, is frequently of some difficulty, but they may usually be recognised by their physical characters, their history, and their imperfect reducibility.

The excision of the tumours rarely offers any difficulty unless, as in Reclus's case, already referred to, fatty tissue is dispersed amidst the elements of the cord. A peritoneal tube must, however, be carefully sought for and dealt with. The result of the operation, apart from failures of antisepsis, is favourable, even in the largest growths, but the probability of recurrence must be borne in mind. Curling<sup>39</sup> and Langeubeck have described examples of this, and in a case of my own<sup>40</sup> the removal was effected twice, and the patient subsequently developed a third lipoma with an enterocele. A failure of antisepsis may be serious owing to the continuity of the growth with the subperitoneal tissue. Kocher speaks of one case in which fatal septicæmia followed, and refers to a case of Tizzoni's which was followed by tetanus. Severe hæmorrhage and injury to the vas have occurred, but are, of course, accidents within the control of the surgeon.

The femoral lipomata have attracted less attention than those in the inguinal region, and are somewhat more rare. They are more common in women, but a case in a male subject was recorded by myself in 1893,<sup>41</sup> and here a hernial sac was found in the root of the tumour.

The mesial lipomata in the linea alba are, perhaps, the most frequent. These, like the inguinal and femoral varieties, may simulate omental hernia very closely, and usually contain a serous pouch, but occasionally, as in a specimen in the museum of St. Thomas's Hospital, may reach a considerable size without leading to any peritoneal change. They are liable to cause troublesome symptoms, which are often difficult to explain. In the past three months I have had two children under my care at St. Thomas's Hospital who were brought by their friends on account of the pain and occasional attacks of vomiting induced by little fatty protrusions

<sup>33</sup> *Bull. et Mém. Soc. de Chir.*, 1859, p. 529.

<sup>34</sup> *Arch. Gén. de Méd.*, 1884, vol. ii, pp. 267, 308.

<sup>35</sup> *Deutsche. Zeitsch. f. Chir.*, 1890, p. 391.

<sup>36</sup> *Loc. cit.*

<sup>37</sup> *Bull. Soc. de Chir.*, 1893, p. 63.

<sup>38</sup> Abstract in *Sem. Médicale*, 1895, p. 314.

<sup>39</sup> *Trans. Path. Soc.*, 1868, p.

<sup>40</sup> *Lancet*, 1893, vol. ii, p. 930.

<sup>41</sup> *Loc. cit.*

scarcely perceptible to the eye. In both the peritoneum was found pouched into the centre of the lipoma, and in both the operation gave immediate relief.

In the removal of these growths it is, of course, desirable to obliterate the opening in the fibrous structures of the linea alba by suture, and so to lessen the probability of return.

The third and perhaps the rarest variety of subperitoneal lipoma appears as a sessile or pedunculated tumour like an ordinary appendix epiploica from the parietal peritoneum, and projecting into the peritoneal cavity or into the sac of a hernia. These, like the normal appendices, occasionally become set free from their attachments, and may form loose intraserosous tumours.

The remaining solid tumours are fibromata, myomata, and sarcomata, besides certain growths of doubtful nature (probably sarcomatous), which have been described by Spencer Wells, Knowsley Thornton, Lockwood, and others. Two primary "encephaloid" retroperitoneal tumours, probably soft sarcomata, are also recorded by Péan.<sup>42</sup> In addition to these, various growths originating in the retroperitoneal lymphatic glands—lymphomata, syphilomata, as well as secondary sarcomata and carcinomata are well known.

The fibromata merge, on the one hand, into the lipomata; on the other, into the myomata, and it is probable that many of the older reports of fibrous tumours really refer to myomata. Purely fibrous growths may, however, develop in the subperitoneal tissue, or may have arisen, in the first instance, from the symphysis pubis, or other parts of the fibrous tissues of the abdominal pelvic wall, and have become detached into the subperitoneal interspaces.

The fibrolipomata have been referred to with the lipomata, of which they are doubtless a modification or transformation, and the fibromyomata in like manner may be regarded as belonging to the section of myomata. An interesting case of multiple fibromyomata in a girl of nine years old, under the care of Professor Saneyoshi at the Tokyo Charity Hospital, is just published.<sup>43</sup> Twenty-one rounded tumours of various sizes, the heaviest of which weighed over 7 pounds, were removed from different parts of the subperitoneal tissue, extending from the pelvis to the hypochondrium. They were soft but elastic, white and waxlike on section, and under the microscope were found to consist of dense fibrous tissue containing some unstriped muscular fibres. These were distinctly encapsulated and shelled out readily. The patient, an anæmic and emaciated child, died of shock half-an-hour after the operation.

The pure myomata spring chiefly from the uterus and its ligaments, but may arise independently from the scattered fibres in the broad ligament or from the suspensory bands in the mesentery and elsewhere. A soft tumour of fibrous aspect, probably a myoma, removed by Péan from the root of the mesentery, weighed nearly 18 pounds.

*Sarcomata* are rare. A fasciculated sarcoma is recorded by Terrier,<sup>44</sup> another was removed by Péan,<sup>45</sup> and Terrillon<sup>46</sup> mentions a sarcoma removed by Olshausen. A still more recent example is given by Arndt,<sup>47</sup> of a subperitoneal sarcoma

<sup>42</sup> *Loc. cit.*

<sup>43</sup> *Sci-i-kwai Medical Journal*, June 12th, 1896.

<sup>44</sup> *Bull. de la Soc. de Chir.*, 1890, p. 67.

<sup>45</sup> *Tumeurs de l'Abdomen*, p. 1146.

<sup>46</sup> *Loc. cit.*

<sup>47</sup> *Centralbl. f. Gynäk.*, No. 24, 1896



loosely adherent to the pelvic surface of the ischium and sciatic ligaments, removed through the vagina in the course of pregnancy, the patient recovering and undergoing a normal delivery at term. It was suggested that it sprang from the ischial periosteum, but the easy enucleation of the growth scarcely indicated such an origin. In Knowsley Thornton's case of probable cystic sarcoma<sup>48</sup> no histological examination was made of the solid part of the tumour, and some uncertainty also attached to two cases brought forward by Lockwood.<sup>49</sup>

The sarcomata, however originating, may be insusceptible of removal on account of their size and imperfect definition. The attempt may be rapidly fatal, as in Péan's case, but more commonly the abdomen has been closed after simple exploration. The diagnosis can rarely be more than a surmise before operation, but the interference with the abdominal circulation, as shown by enormous dilation of the superficial veins, appears to be greater than in other tumours.

The cysts of the subperitoneal tissue are nearly all developed from fetal relics. Dermoids, probably of ovarian origin, have been found in the broad ligaments. The duct of Gartner, and remains of the Wolffian body in the female are responsible for other cystic formations, and the presacral dermoids probably spring from the remains of the postanal gut. These latter growths, found in the connective tissue between the rectum and the front of the sacrum and coccyx, may interfere seriously with function. They have been removed by F. Page<sup>50</sup> and Clutton<sup>51</sup> by means of an incision behind the anus.

The explanation of the genesis of some cystic growths is more difficult. W. Robinson<sup>52</sup> found in a child, aged 2, a number of cysts with their transparent walls filled with straw-coloured fluid, in the root of the mesentery, and not invading the pelvis. An operation for their removal was fatal. Péan excised a multilocular cyst of uncertain origin from the mesorectum, and records three other cases of subperitoneal cyst, all in women, in which operation for removal was fatal in two, and was followed by suppuration in the third. The retroperitoneal cysts, as pointed out by Péan, may grow to a large size, and when enlarging are liable to invade the mesentery or mesocolon, and to find their way into the true pelvis behind the rectum, in either situation tending to become adherent to the gut. A great many cysts commencing in the broad ligaments, however, involve the mesorectum and sigmoid mesocolon, and may so encroach upon the territory of the retroperitoneal cysts.

Hydatid cysts have been found in the subperitoneal tissue as elsewhere. A case has lately been recorded by Dr. Peter Thompson<sup>53</sup> in which one, of the size of an orange, was found in the transverse mesocolon, in addition to five cysts in the liver.

It remains only to allude to the final sections in the classification. Hæmorrhage may arise from rupture of healthy vessels by accidental injury, such as those attending fractures of the pelvis, from the tearing of vascular structures, such as the round ligament, during parturition, or in other ways; or from

<sup>48</sup> BRITISH MEDICAL JOURNAL, 1882, ii, p. 1242.

<sup>49</sup> *Med. Soc. Trans.*, 1895, p. 1.

<sup>50</sup> BRITISH MEDICAL JOURNAL, 1891, i, p. 406.

<sup>51</sup> *Clin. Soc.*, April 24th, 1896.

<sup>52</sup> BRITISH MEDICAL JOURNAL, 1891, i, p. 210.

<sup>53</sup> BRITISH MEDICAL JOURNAL, 1896, i, p. 1332.



the giving way of diseased arteries, atheromatous or aneurysmal, or of varicose veins.<sup>54</sup> The blood poured out into the subperitoneal spaces may become circumscribed, or may spread diffusely along the connective tissue planes, following the courses already indicated, and the recognition of the condition may offer great difficulty. The diagnosis of hæmatoma of the broad ligament is a problem which the gynæcologist is often called upon to solve. Perinephric hæmatoma may closely resemble a hydronephrosis or circumscribed extravasation of urine. An effusion of blood into the cavum Retzii often simulates an over-distended bladder or a collection of urine from extraperitoneal or even intraperitoneal rupture of the viscus. Extravasation or exudations of lymph have not yet been described as such, but they may occur from injury to the retroperitoneal lymphatics or from obstruction, and it is possible that some of the serous cysts found in the neighbourhood of the kidney are due to a dilatation of lymph spaces.

The extravasation of secretions and excretions—for example, urine, bile, and fæces—is occasionally set up by accident or disease; it sooner or later excites inflammation, and the condition becomes merged into that of cellulitis. A rupture of the kidney or ureter may lead to a false hydronephrosis, and the urine may run downwards into the pelvis in the course of the duct, as in a case of Allingham's.<sup>55</sup> Other examples of a like nature have been published by W. J. Collins,<sup>56</sup> and in one case the kidney was excised by Barker. Gaseous accumulations may arise in two principal ways. The gas may be air derived from a communication with the lung, as when a pulmonary abscess finds its way through the diaphragm, or in complicated fracture of the ribs; or from a communication with the intestinal canal, as in appendicitis with perforation; or from decomposition of pus.

Many cases of gaseous abscess of the abdominal wall have been reported, and some of these have been traced to their origin in connexion with some part of the intestinal canal, but others have been difficult to explain. In a case under my charge the patient, a woman, aged 25, was admitted with considerable febrile disturbance and prostration and an emphysematous swelling extending over the right side of the abdomen and lower part of the thorax. There were no local symptoms to account for the condition. On incision in the right hypochondrium a cavity containing a large quantity of foul gas with a little pus was traced through the muscular wall of the abdomen beneath the costal cartilages, where it appeared to communicate with the subphrenic tissue. The fever subsided rapidly after the operation, the discharge steadily diminished and at the end of three weeks the wound closed leaving the patient well. The origin in this case was quite obscure. There were no signs of appendicitis or any other intestinal lesion, the thoracic organs were healthy, and the recovery was complete and permanent. An interesting case is recorded by Coupland<sup>57</sup> in which a gaseous abscess in a boy aged 15, rose above and behind the liver, surrounded the

<sup>54</sup> See *Trans. Path. Soc.*, 1894, On a Case of Perirenal Hæmorrhage, by Dr. F. H. Hawkins, with discussion.

<sup>55</sup> *BRITISH MEDICAL JOURNAL*, 1891, i, p. 699.

<sup>56</sup> *Lancet*, i, 1885. Other instances have been published by Poland, *Guy's Hospital Reports*, 1869, p. 85; Hadden, *Lancet*, December 6th, 1890, and Knox, *Lancet*, December 19th, 1891.

<sup>57</sup> *BRITISH MEDICAL JOURNAL*, 1889, i, 636.

kidney and extended downwards, in a separate pouch, to the right iliac fossa as far as Poupart's ligaments. The patient recovered and the origin of the condition remained unknown.

Atrophy of the subperitoneal tissue may be induced by tight lacing and deficient exercise in women, by repeated pregnancies or by exhausting disease, and appears to be intimately associated with the pathology of movable kidney. The kidney and renal vessels, as may be easily shown, lie in a kind of lymph space in the midst of the so-called fatty capsule, and may be readily shelled from its bed. The structure of the adipose investment and its connections with the abdominal wall, reinforced by the muscular power of the wall itself, are usually strong enough to support the organ in its normal situation and to counteract the effects of gravitation, which, in the erect posture of the trunk, constantly tend to draw it down towards the pelvis. In the male subject the resistance to displacement is so great that external violence will more easily rupture the organ than alter its position. In the female, on the other hand, the tissues are naturally weaker, and the abdominal walls are often so enfeebled that when the kidney is subjected to any violent succussion or concussion the forces of sustentation are too feeble to oppose displacement, and the shifting of position, with the accompanying disturbances of nervous, vascular, and other structures, is permitted. Küster, of Marburg,<sup>58</sup> attributes the condition in all instances to mechanical causes, and points out that 94 per cent. of the cases are in women, 6 per cent. only in men; while ruptures of the kidney occur in nearly inverted ratios in the two sexes—92 per cent. in men, 8 per cent. in women. It is more frequent on the right side, but the anatomical reasons given for this appear to be scarcely sufficient. The ballooning of the rectal ampulla most frequently met with in emaciated women is probably due to atrophy of the subperitoneal fat connective tissue in the pelvis.

The lowering of the mesenteric attachment after middle age, noticed by Mr. Lockwood, as favouring the occurrence of hernia, is partly due to a diminished sustentacular power in the subperitoneal tissue, and partly perhaps to the accumulation of the retroperitoneal fat, but must be regarded as in some sense degenerative. Freund was of opinion that some cases of hysteria were due to atrophic changes in the pelvic subperitoneal tissue, but this view has not been confirmed.

In conclusion I venture to hope that the subperitoneal planes of connective tissue may be held as worthy not only of the attention of the anatomist but of the close study of the surgeon, and that its diseases may find a section of their own in our textbooks.

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<sup>58</sup> *Centralbl. f. Chirurg.*, 1895. Supplement, p. 120.